

Competence-oriented teaching:

combining theory and practice in a future-oriented teacher education

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ABSTRACT

Linking theory and practice in university teacher education is a necessary condition for the development of didactic competence. With this in mind, we developed a seminar to promote competence-oriented teaching through a continuous exchange of practical expertise with current teachers. As a result, all of the participants (students and teachers) should acquire greater pedagogical knowledge as a central element of their teaching expertise. In order to examine the impact of the seminar, we measured the development of the competence-oriented didactic knowledge of 57 participating students and 6 accompanying teachers. To do so, we used a pre–post design with different control groups. The results show a significant increase in didactic knowledge. But they also show that diagnostic competences need significant further development. Hence, in the future, the seminar will be supplemented by video-based learning elements, which in particular address the difficulty of teaching competences in classrooms with a wide variety of pupils.

INTRODUCTION

Promoting the development of pedagogical content knowledge is, distinct from general pedagogical knowledge and content knowledge, a part of professional knowledge (Shulman, 1986; Baumert & Kunter, 2013) and, consequently, also of teacher education. Baumert & Kunter (2006) argue that ‘domain-specific knowledge – that is, knowledge of the content and teaching of a subject – is a core element of teachers’ professional competence’ (p. 31). It should be noted

that theoretical knowledge must be enriched with practical elements (or the other way around) (Oonk et al., 2015). The literature often speaks of a gap between theory and practice (Kessels & Korthagen, 1996; Allsopp et al., 2006), which hinders both the student as well as the teacher educators. Nevertheless, it is one of the key tasks of teacher educators to bridge both for students (Kessels & Korthagen, 1996).

For some time, there has been a need for a closer link in teacher education

KEYWORDS

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between theory and practice, and so for the development of professional practical skills (Oelkers, 1999). The process of linking theory and practice must have both well-founded criteria and reflect on experience (Hascher, 2014). This means students should come to understand theoretical knowledge neither simply as facts nor as mere guidelines for practical application. Thereby, their understanding of both theory and practice can be renegotiated and expanded (Neuweg, 2011).

The current research literature offers

various ideas for combining theory and practice in teacher education. On the one hand, the difference between theory and practice can be used positively for the development of knowledge and good practice (Golden-Biddle et al., 2003). Bengtsson (1993) emphasises that distance from practice is needed in order to critically reflect on it. Although the implicit knowledge of students should be acknowledged, students cannot learn how good teaching works just by modelling and or 'learning-by-doing'. Rather, students need this critical reflection on their own practical experience and the opportunity to exchange ideas through cooperative learning (Hascher, 2014). On the other hand, theories should be linked with specific situations by means of practical experience. Dewey (1904) argued that theoretical learning would only be rich and meaningful if it was situated in practice. A way to combine theory and practice is through practical cooperation between partners. Cooperation helps to narrow the gap between theory and practice (Bezzina et al., 2006). Zeichner (2010) describes the 'third space' as an opportunity for different cohorts to bring their knowledge together and create new knowledge in this third space. Another way to organise long-term collaborative effort is through communities of practice (Lave, 1991).

With regard to content, the focus of teacher education lies in the development of the students' competences. The focus in the classroom is the development of the pupils' competences. This, therefore, ought to be the focus of teacher education as well (Arnold et al., 2011). Further, Weinert et al. (1990) emphasise that diagnostic competence is one of the key factors of teaching expertise. Diagnostic competence means the competence to analyse and diagnose the progress of students' competence, with the goal of promoting them individually. (Cognitive) diagnostic competences are also called diagnostic skills (Brunner et al., 2013; Binder et al., 2018) because they are partly to be found in the knowledge

of pedagogical content and partly in pedagogical knowledge.

Building on this problem area, a seminar concept is being developed to promote students' pedagogical content competences. In the seminar, theoretical and practical elements are combined to expand the vocational competences of students. This paper presents the concept. The seminar is analysed to assess how far students' pedagogical competences were developed and where more support is needed.

COMBINING THEORY AND PRACTICE IN A PEDAGOGICAL CONTENT SEMINAR

The seminar was developed through the collaboration between six active teachers. The six teachers have been working together with university lecturers for about four years on the construction and further development of the seminar. The goal of the seminar is for students to combine theory and practice in order to develop their own pedagogical content competences (Oonk et al., 2015), and to recognise the significance of these competences for encouraging their pupils' own individual content competences (Arnold et al., 2011). The seminar adhered to the following time line:

(1) Content of the seminar

Active teachers and education students come to an agreement about the content of the seminar. The content should be important for everyone involved.

(2) Meeting between active teachers and students

Students visit their assigned teacher in class for one lesson. In this way, they get an authentic feeling for the teacher and the class during a lesson. This meeting facilitates later exchanges regarding dialogue and coordination (Six et al., 2007).

(3) Examination of theory

Students in the seminar examine theories particular to the subject (1). This is needed for the next step, which is the development of pedagogical content for the accompanying teacher and class.

(4) Development of pedagogical content

Students develop pedagogical content in cooperative learning sessions. The accompanying teacher should put these elements into practice during a lesson.

(5) Dialogue with the accompanying teacher

Students share their ideas with the six accompanying teachers, which encourages a dialogue between the university and the school (Hascher, 2014). The six active teachers get coaching from the students on this content, which they should use in their lessons. The teachers have the opportunity to intervene, to give practical tips, and to revise the teaching-learning environment that has been developed.

(6) Observation and reflection

The students' plan is carried out by the experienced teacher because the teacher is familiar with the class, understands its particular pedagogical challenges and has the expertise to solve them quickly. In this way, the focus of the lesson can be more on the content and problems associated with the content than with pedagogical problems. This means that the students have enough distance from the practical experience to allow for critical reflection (Bengtsson, 1993). To observe all of the seminar lessons, the classrooms and the seminar room at the university can be linked via a bidirectional video conference system (Drexhage et al., 2016). Students analyse and reflect on how the content they developed was used. In addition, the teacher gives feedback to the planning group after the lesson. This common reflection can be especially helpful for giving students a better understanding of the pupils' learning process (Kleinknecht & Gröschner, 2016).

METHODS AND DATABASE

This paper comprises two methodological elements to evaluate the seminar plan. On the one hand, a partially standardised questionnaire is utilised to analyse how students experience the combination of theory and practice in the seminar (Leiss et al., 2016). On the other hand, a longitudinal study is used as a pre–post test, which analyses the development of the pedagogical content competences. The test is specified to the content of the seminar in the current semester.

The questionnaire was only used to analyse the perception of the seminar as a first evaluative step. Correspondingly, the evaluation is based on the data of the seminar participants for only one semester ($n = 20$). The questionnaire had questions on the relationship between theory and practice, using a four-level Likert scale. In order not only to control the extent to which the seminar was rated positively, but also to measure the learning progress, a performance pre–post test was used as a control instrument. The reliability of the test items for pedagogical content competences is acceptable (Cronbach's $\alpha = 0.68$) (Leiss et al., 2016).

After that evaluation there was one quantitative performance evaluation in each semester over two years. The focus of that examination was the development of students' and teachers' competences. The sample consists of students in mathematics ($n = 97$) and accompanying active mathematics teachers ($n = 6$) from northern Germany. Fifty-seven students visited the four seminars during four semesters; the other students visited another competence-oriented content lecture. They form the control group. A pre–post test is used as well. The teachers only do the test once, because they do not take part in the intervention. This group serves as a second control group. The reliability of the test items for pedagogical content competences is acceptable (Cronbach's $\alpha = 0.62$).

RESULTS

First, the results of the questionnaire study illustrate that all the students consider theory and practice to be important in teacher education. They tackle different pedagogical elements in a theoretical as well as in a practical way (Figure 1).

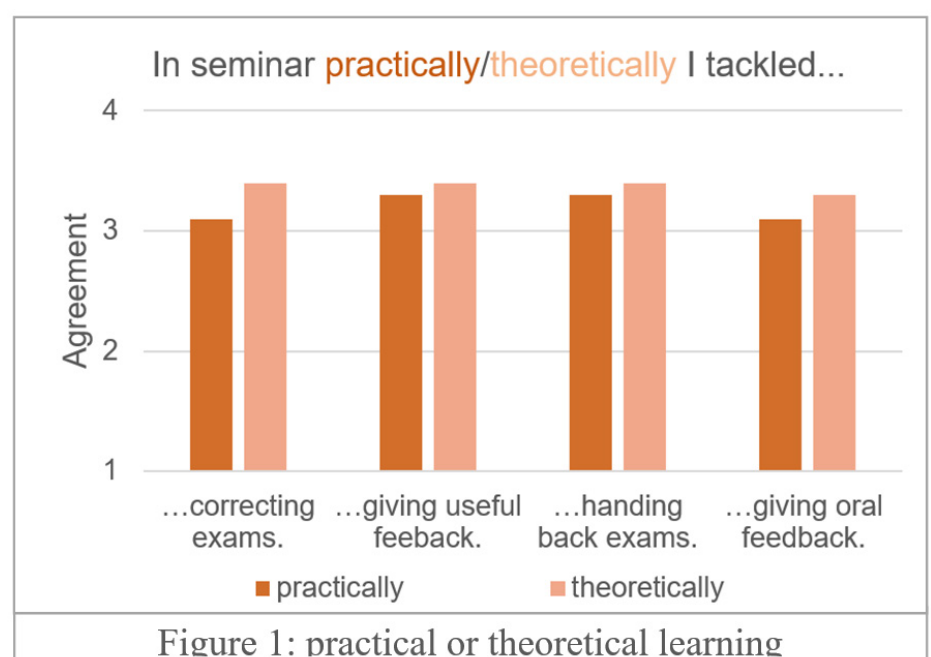
Further, the results in Figure 2 show that a small majority of the participants hold that theory is understood by practice, but at the same time there are also many who think that practice is understood by theory. Looking at the correlation between this and the importance of theory and practice shows that those participants who consider practice to be important also tend to believe that theory is understood by practice (significant correlation: .292*) rather than that practice is understood by theory (non-significant correlation: .011). Those persons who consider theory to be important mostly tend to believe practice is understood by theory (significant correlation: .343*) rather than that theory is understood by practice (non-significant correlation: .176).

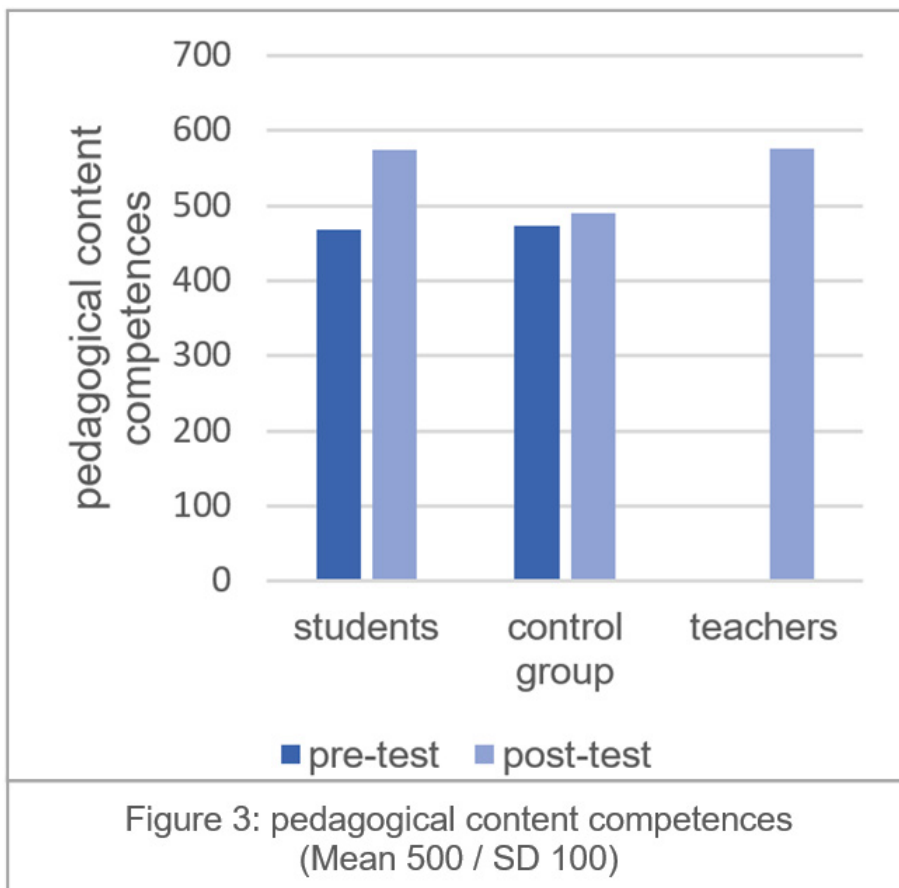
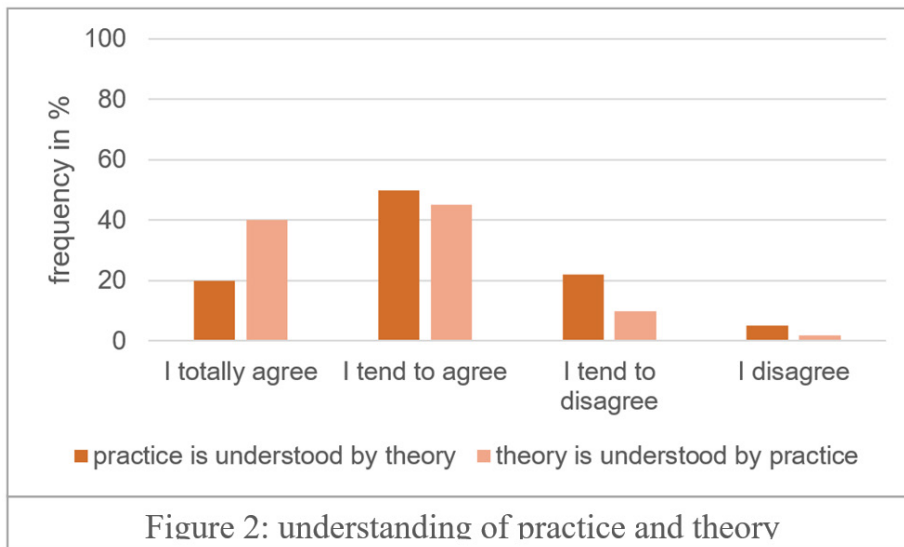
The results of the pre–post-test illustrate that the seminar leads to a significant

change in the pedagogical content competences. The change corresponds to a significant effect ($d = 1.13$) (Leiss et al., 2016).

The results of the following performance evaluations confirm the one presented. The pedagogical content competences of the sample of students in the seminar and the control group are approximately the same in the pre-test at the beginning of the semester. The data shows that the pedagogical competences of the students in the seminar are higher in the post-test than the pedagogical competences of the control group. The increase of the pedagogical content competences is significant. The effect size d differs between 0.8 and 1.2 over time. It is conspicuous that students show as much pedagogical content competences after participating in the seminar as the active teachers do.

In a detailed qualitative analysis of each element, it becomes clear that specific elements cause problems for students as well as for the active teachers. Only 10% of the sample can analyse and diagnose the process of finding a solution for a difficult pupil, while 73.5% can retrieve factual knowledge about specific competences.





DISCUSSION AND FUTURE PROSPECTS

The results reveal deficits in teacher education. Students will need pedagogical content knowledge and diagnostic skills in their future life as teacher. The responsibility of teaching education is to prepare them for this challenging task. Apparently, as the results show, this seminar plan is a good way to promote pedagogical content

competences. However, there is still a strong need to promote the pedagogical content knowledge in a competence-oriented way.

This study and its positive outcome are an argument for this seminar plan as an additional tool in teacher education, as well a general encouragement to develop seminars which link theory and practice and promote the professional competence of trainee and active

teachers. The seminar should be accompanied by further research to evaluate other possible foci in addition to the link between theory and practice.

As a consequence, the next step in seminar development should involve aspects that link theory and practice in the context of pedagogical content knowledge and diagnostics. This should enable the seminar participants to successfully handle even the difficult tasks of process diagnostics on the test and, hopefully, similar challenges later in the classroom. Correspondingly, the seminar plan presented here may be complemented with video-based learning elements to promote particularly diagnostic skills, as '[d]igital application... seems to be able to fulfil a useful function in the area between theory and school practice' (Oonk, 2009, 25).

There will be three new sessions in the next version of the seminar. In the first session, students will tackle a pupils' problem, which is then focused upon in the video sequences used in the following sessions. They learn important content knowledge and important pedagogical content knowledge to solve the problem themselves and to be able to teach it in classrooms. The second session is designed to promote diagnostic skills in real recorded situations. Students watch three videos with different pupils' methods for finding solutions through cooperative work during one class session. The task is to diagnose what the pupils' problems are. In the last session, students focus on the videos of teachers' interventions response to pupils' problems. The goal is to develop alternatives to these interventions.

Even if it is still a long way off, the development of this elaborate seminar plan encourages the combination of theory and practice necessary for student teachers to successfully respond to the challenges of competence-based and future-oriented schooling. ■

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